Integrating culturally responsive place-based content with language skills development for curriculum enrichment

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2009

Contents

Introduction to the Developmental Language Process in Science

OVER THE YEARS, much has been written about the successes and failures of students in schools. There is no end to the solutions offered, particularly for those students who are struggling with academics. For example, there have been efforts to bring local cultures into the classroom, thus providing the students with familiar points of departure for learning.

While the inclusion of Native concepts, values,and traditions into a curriculum provide a valuable foundation for self-identity and cultural pride, they may not, on their own, fully address improved academic achievement.

Through science lessons, students are exposed to new information and to the key vocabulary that represents that information. While the students may acquire, through various processes, the scientific information, the vocabulary is often left at an exposure level and not internalized by the students. Over time, this leads to language delay that impacts negatively on a student's ongoing achievement.

Due to weak language bases, many Native Alaskan high school students struggle with texts that are beyond their comprehension levels and writing assignments that call for language they do not have.

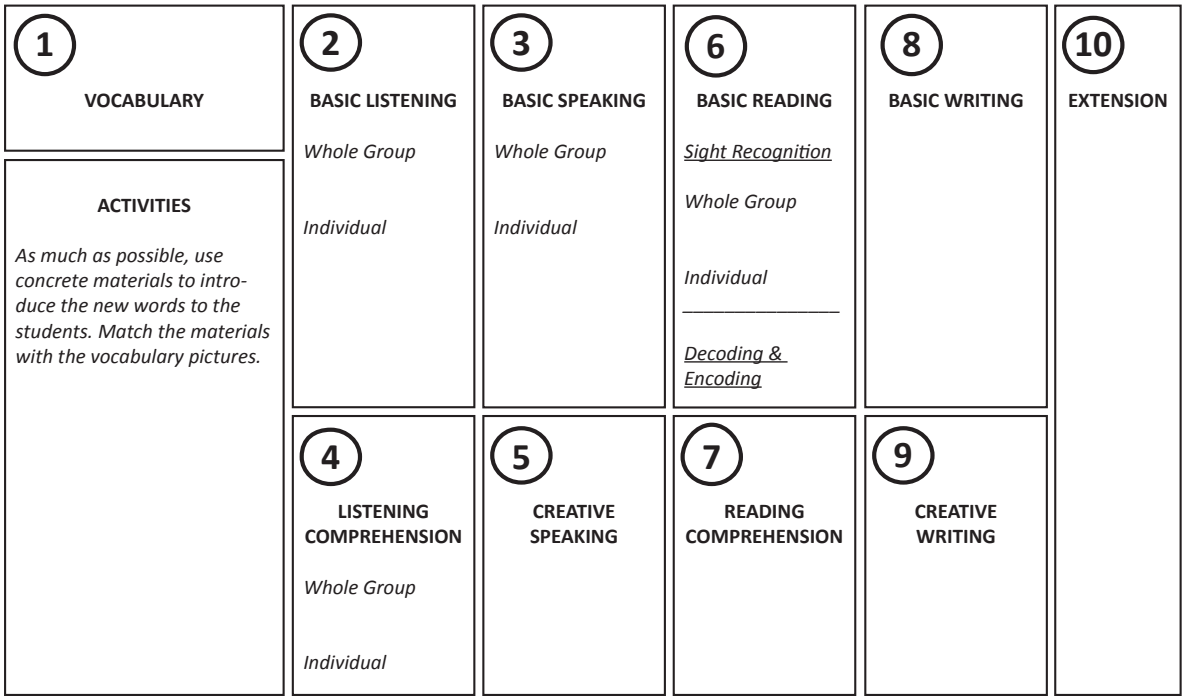
This program is designed to meet the academic realities faced by high school students every day, using a developmental process that integrates culture with skills development.

To this end, each key vocabulary word, in science, is viewed as a concept. The words are introduced concretely, using place-based information and contexts. Whenever possible, the concept is viewed through the Native heritage cultural perspectives. Using this approach, the students have the opportunity to acquire new information in manageable chunks, the sum total of which represent the body of information to be learned in the science program.

When the key vocabulary/concepts have been introduced, the students are then taken through a sequence of listening, speaking, reading, and writing activities designed to instill the vocabulary into their long-term memories.

This is the schema for the Developmental Language Process:

The Developmental Language Process



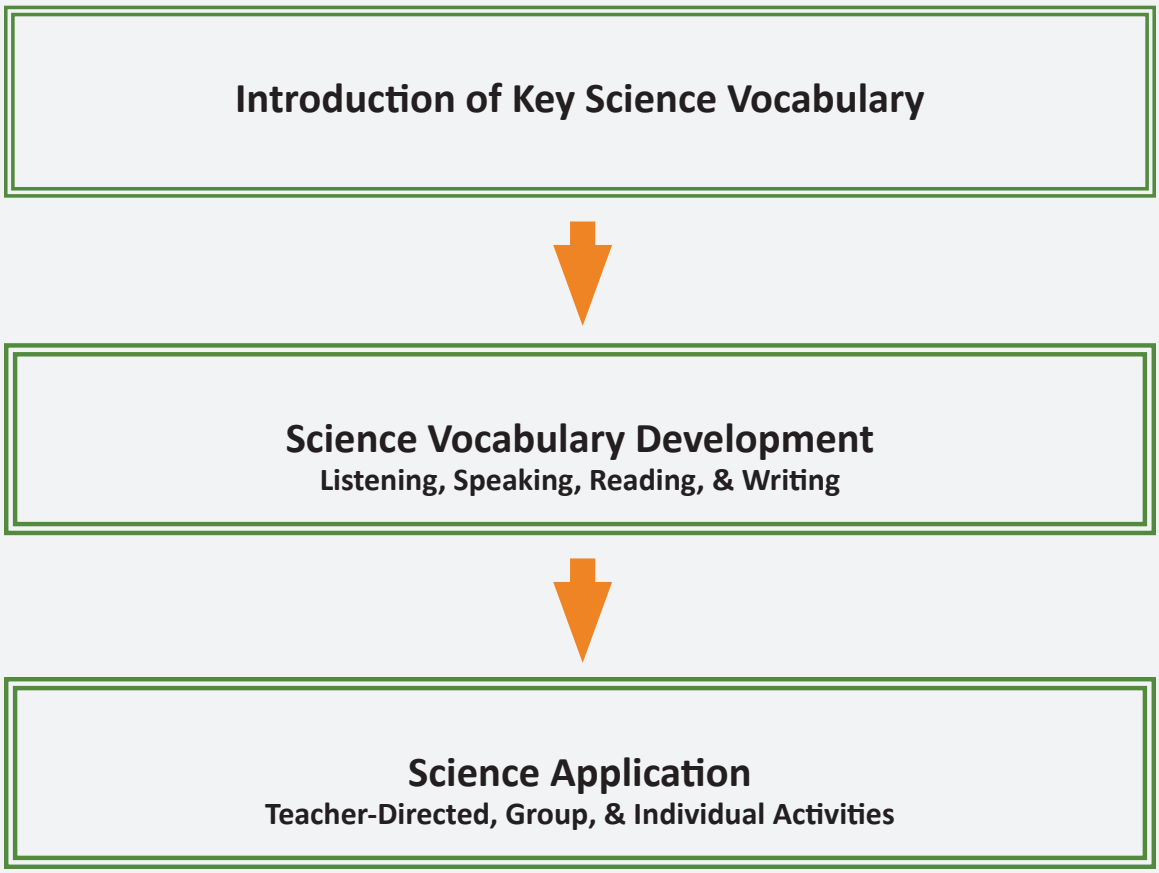
Finally, at the end of each unit, the students will participate in enrichment activities based on recognized and research-based best practices. By this time, the science information and vocabulary will be familiar, adding to the students' feelings of confidence and success. These activities will include place-based and heritage culture perspectives of the information learned.

This approach is radically different from current practices in most science classes. Historically, little or no formal vocabulary development takes place. It is assumed that the vocabulary is being internalized during the learning process, which is most often an erroneous assumption.

Increasing the language bases of the students will lead to improved comprehension in listening and reading, and higher levels of production in creative speaking and writing.

This, coupled with the place-based and culturally-responsive content, will provide the students with the foundations necessary for ongoing confidence and achievement.

The Integration of Place-Based, Culturally Responsive Science Content and Language Development



UNIT 1

A–1: Science as Inquiry Process

KEY VOCABULARY

Culturally Responsive & Place-Based Introduction of Science Vocabulary

PREDICT

Place-Based Perspective

Show the students the picture of the fortune cookies from page 63.* Have them describe the purpose of the cookies (i.e., to tell one's fortune). Use this to introduce "predict" to the students. Have the students cite other common predictions, such as weather, sports, and so on.

* Use a real fortune cookie, if available.

Heritage Cultural Perspective

Native people of Southeast Alaska used many natural phenomena to predict the future. For example, if thunder occurred in the middle of the winter, Native people would predict a mild winter. They would predict rain or snow, if a ring appeared around the moon.

OBSERVE

Place-Based Perspective

Show the students a pair of binoculars and a magnifying glass. Have them tell the use of each—lead this into observing different things. Have the students suggest other methods of observing, such as telescopes and microscopes.

Heritage Cultural Perspective

Native people made observations of the natural world that played vital roles in everyday life in Southeast Alaska. For example, Natives observed the migratory habits of fish and birds, the cycle of tides, and weather. Also, it was common for people to observe the habits of animals and the body language of other people.

DESCRIBE

Place-Based Perspective

Mount the picture from page 65 on the board. Use words to describe the picture (e.i., sour, heavy, light, etc.). The students must identify each picture by its descriptor. Continue until all of the pictures have been described and identified.

Heritage Cultural Perspective

Traditional stories describe in detail historical accounts of clan history. This includes names of people, places, things, and belongings. Personal introductions include names, clans, houses, and descriptions of lineage—from fathers, to grandfathers, to great grandfathers, to great great grandfathers.

Culturally Responsive & Place-Based Introduction of Science Vocabulary

CLASSIFY

Place-Based Perspective

Mix colored clothes and white clothes together. Tell the students that you are going to do your laundry and have them suggest what you need to do first. Lead the students to suggest that the clothes have to be sorted or classified. Cite examples of how things can be classified by type, color, size, taste, feel, and so on.

Heritage Cultural Perspective

The clan system in Southeast Alaska is a process of classification. People are grouped by their moieties, clans, communities, and houses.

Salmon are classified by their species and habitats.

GENERALIZE

Place-Based Perspective

Present the students with chocolate bars, pop, sugar, and other sweet items. Have the students suggest what might happen to a person who eats too many sweets. Have them generalize that the sweets might cause bad teeth, excess weight, and complexion problems.

Heritage Cultural Perspective

Native people would generalize that a poor berry season would lead to more aggressive behavior in bears. They would also generalize that if the winter were cold and the snowfall did not insulate the spawning waters, many salmon fry and fingerlings would perish.

INFER

Place-Based Perspective

Show the students the picture depicting "sad" from page 67. Have the students suggest why the fireman might be sad. Lead the students to realize that they are guessing as to the causes of his sadness. Introduce this as inferring based on some information provided. Cite other examples that may cause one to infer.

Heritage Cultural Perspective

Native people used stories to cause people to infer a variety of information. For example, in Raven and the Salmon Box, it is implied that the Raven brought the salmon to the streams to spawn. This provides the reader with the opportunity to infer that Raven provided food for the people.

Culturally Responsive & Place-Based Introduction of Science Vocabulary

COMMUNICATE

Place-Based Perspective

Show the students the picture from page 69 and a cell phone. Have the students tell how the two are the same—they both represent forms of communication. You may wish to introduce the SOS signal in Morse Code as ...---.... Have the students name other forms of communication used today.

Heritage Cultural Perspective

Native people use totem poles, crests, house posts and screens, ceremonial hats, and other regalia to communicate family histories and origins. When Native people communicate through traditional oratory, recognition and acknowledgement of the opposite moiety is customary.

INQUIRE

Place-Based Perspective

Show the students the picture from page 71 that represents a house for sale. Have the students suggest what information people should have before they buy a house. Use this to introduce "inquire". Have the students tell of other situations that may cause people to inquire about some form of information.

Heritage Cultural Perspective

Historically, when visitors approached a Native village by boat or canoe, the clan leader stood on the shore and inquired who they were and where they came from.

LESSONS

Science Language for Success—Lesson 1

Introduce the key science vocabulary, using concrete materials and/or pictures.

LISTENING

Use the Mini Pictures activity page from the Student Support Materials. Have the students cut out the pictures. Say the key words and the students show the pictures.

Let's Move

Identify an appropriate body movement for each vocabulary word. This may involve movements of hands, arms, legs, etc. Practice the body movements with the students. When the students are able to perform the body movements well, say a vocabulary word. The students should respond with the appropriate body movement. You may wish to say the vocabulary words in a running story. When a vocabulary word is heard, the students should perform the appropriate body movement. Repeat, until the students have responded to each word a number of times.

What's the Answer?

Before the activity begins, develop questions related to the concept being studied. For each question, prepare three answers—only one of which in each set is correct for the question asked. Ask the students the question and then read the three answers to them. The students should show you (using their fingers or prepared number cards) which answer is correct for the question asked. Repeat this process with other questions and answers.

SPEAKING

Right or Wrong?

Mount the vocabulary pictures on the board. Point to one of the pictures and say its vocabulary word. The students should repeat the vocabulary word for that picture. However, when you point to a picture and say an incorrect vocabulary word for it, the students should remain silent. Repeat this process until the students have responded a number of times to the different vocabulary pictures.

Hand Tag

Group the students in a circle on the floor. Have the students place their hands on the floor, palms down. Stand in the center of the circle with the vocabulary picture and a flashlight. The object of the activity is to attempt to tag a student's hand or hands with the light of the flashlight. The students must pull their hands from the circle when they think they are about to be tagged. When you eventually tag a student's hand or hands, he/she must then say a complete sentence using the word for a vocabulary picture that you show. Repeat this process until many students have responded.

Science Language for Success—Lesson 2

READING

Introduce the science sight words to the students—match the sight words with the vocabulary pictures. The sight words are included in the Student Support Materials, attached to these lesson plans.

Sight Word Bingo

Before the activity begins, prepare a page that contains the sight words. Provide each student with a copy of the page. The students should cut out the sight words. When the students have cut out their sight words, each student should lay all of the sight words, but one, face down on his/her desk. Show a vocabulary picture. Any student or students who have the sight word for that picture face-up on their desks should show the sight word to you. Then, those sight words should be placed to the side and other sight words turned over in their place. Continue in this way until a student or students have no sight words left on their desks.

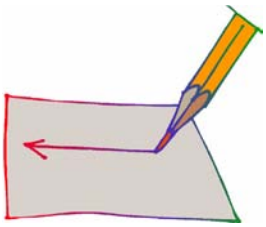
Letter Encode

Give each student five copies of a page that contains the letters of the alphabet. The students should cut all of the letters out. Mount one of the science pictures on the board. The students must use the cut out letters to spell the word. Review the students' work. Repeat, until all of the words have been spelled in this way. The students should keep their letters in individual envelopes for use in other units.

Student Support Materials

Have the students work on the activity pages from the Student Support Materials for this Unit.

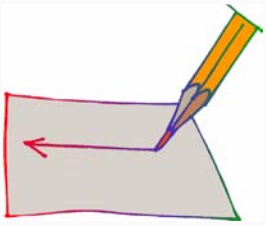
WRITING



Watch Your Half

Prepare a photocopy of each of the vocabulary pictures. Cut the photocopied pictures in half. Keep the picture halves in separate piles. Group the students into two teams. Give all of the picture halves from one pile to the players in Team One. Give the picture halves from the other pile to the players in Team Two. Say a vocabulary word. When you say "Go," the student from each team who has the picture half for the vocabulary word you said should rush to the board and write the word on the board. The first player to do this correctly wins the round. Repeat until all players have participated. This activity may be played more than once by collecting, mixing, and redistributing the picture halves to the two teams.

WRITING (CONTINUED)



Sentence Completion

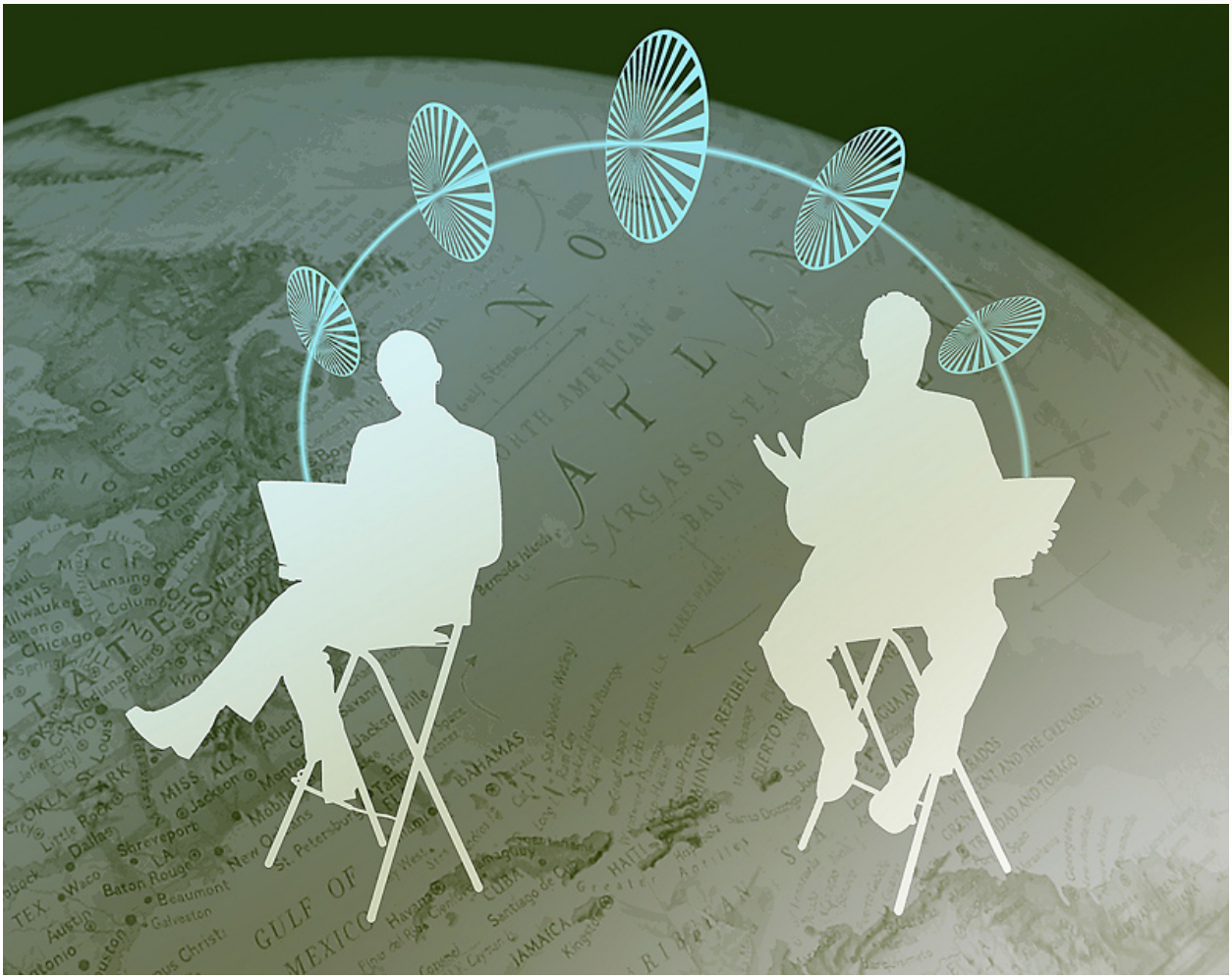
Write a number of sentence halves on individual sentence strips. These should include both the beginning and ending halves of sentences. Mount the sentence halves on the board and number each one. Provide the students with writing paper and pencils/pens. Each student should then complete ONE of the sentence halves in his/her own words, writing his/her part of the sentence on the sheet of paper. When the students have completed their sentence halves, have a student read ONLY the sentence half he/she wrote. The other students must then attempt to identify the "other half" of the sentence on the board (by its number). Repeat until all of the students have shared their sentence halves in this way.

Student Support Materials

Have the students work on the activity pages from the Student Support Materials for this Unit.

VOCABULARY PICTURES

CLASSIFY


NORTH ATLANTIC
SARGASSO SEA
BASIN
GULF OF MEXICO
BAHAMAS
JAMAICA
CUBA
Havana
Santiago de Cuba
Dallas
Shreveport
Baton Rouge
Beaumont
Galveston
Austin
Waco
Jackson
Chicago
Indianapolis
Lansing
Columbus
Toronto
Ottawa
Montreal
Quebec
St. Louis
Little Rock
Atlanta
Charleston
Jacksonville
Tampa
St. Petersburg
New Orleans
Mobile
Memphis
Louisville
Evansville
Fort Wayne
Milwaukee
Detroit
Buffalo
Bermuda Islands
Gulf Stream
Labrador Current
Grand Banks
Azores
Canary Islands
Cape Verde Islands
Lesser Antilles
Greater Antilles
Haiti
Dominican Republic
Puerto Rico
Trinidad and Tobago
Barbados
Grenada
Curaçao
Aruba
Venezuela
Colombia
Panama
Costa Rica
Nicaragua
Honduras
Belize
Yucatan Peninsula
Florida Keys
Florida Straits
Bahama Islands
Cayman Islands
Jamaica Channel
Windward Passage
Mona Passage
Anegada Passage
Virgin Islands
Leeward Islands
Guadeloupe
Martinique
Saint Lucia
Saint Vincent and the Grenadines
Tobago
Trinidad
Orinoco River
Amazon River
Mississippi River
Ohio River
Missouri River
Great Lakes
Lake Superior
Lake Michigan
Lake Huron
Lake Erie
Lake Ontario
Hudson Bay
James Bay
Gulf of St. Lawrence
Newfoundland
Nova Scotia
Prince Edward Island
New Brunswick
Maine
Vermont
New Hampshire
Massachusetts
Rhode Island
Connecticut
New York
Pennsylvania
New Jersey
Maryland
Delaware
Virginia
West Virginia
North Carolina
South Carolina
Georgia
Alabama
Mississippi
Louisiana
Arkansas
Missouri
Kentucky
Tennessee
Illinois
Indiana
Ohio
Michigan
Wisconsin
Minnesota
Iowa
Kansas
Nebraska
South Dakota
North Dakota
Oklahoma
Texas
New Mexico
Colorado
Wyoming
Montana
Idaho
Utah
Arizona
Nevada
California
Oregon
Washington
Alaska
Hawaii

COMMUNICATE

DESCRIBE

GENERALIZE

INFER

INQUIRE

OBSERVE

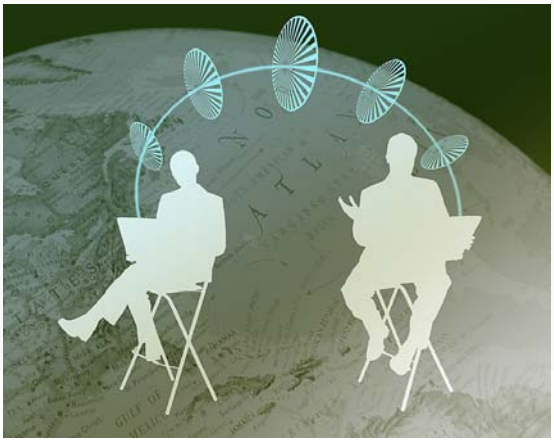
PREDICT

STUDENT SUPPORT MATERIALS

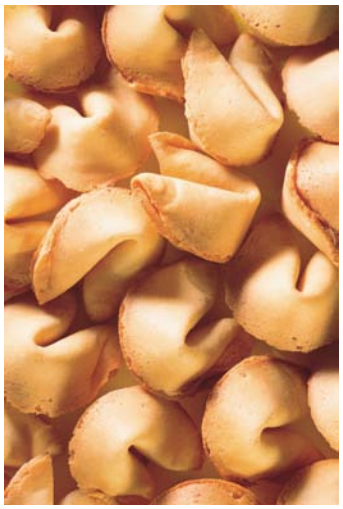
Listening • Mini Pictures

Listening: Mini Pictures

Prepare a copy of these pages for each student. The students should cut out the pictures and lay them on the floor or desk. Say the key words and the students should show you the pictures. Repeat a number of times. This activity can also be done with pairs of students to determine who is the fastest player.



Listening: Mini Pictures



STUDENT SUPPORT MATERIALS

Listening Comprehension

Listening Comprehension

Read the following sentences to the students. The students should circle "true" or "false" for each of the sentences. Review the students' work.

1. The weatherman predicts how much gasoline will cost during a rain storm. **True** **False**

2. Binoculars can be used by a hunter to observe the animals that are being hunted. **True** **False**

3. Phone books describe the steps necessary to make different food items from different restaurants. **True** **False**

4. Things can be classified only by their color and size. **True** **False**

5. We can generalize things based on information that we hear. **True** **False**

6. When we infer, we are measuring the things we need to make a cake. **True** **False**

7. E-mails are one way we can communicate with other people. **True** **False**

8. To inquire about something means to ask questions to get information. **True** **False**

STUDENT SUPPORT MATERIALS

Sight Words

describe

observe

predict

infer

generalize

classify

inquire

communicate

STUDENT SUPPORT MATERIALS

Basic Reading • Sight Recognition

Sight Words Activity Page

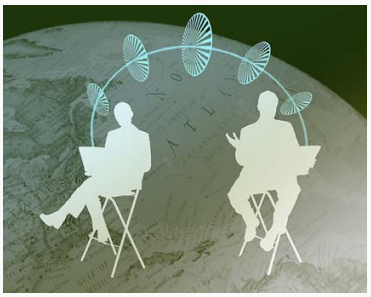
Have the students highlight or circle the words in this word find. Words appear horizontally.

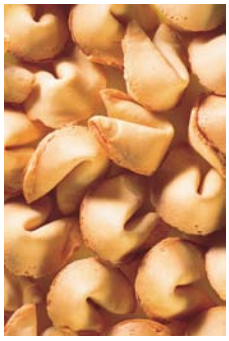
describe
generalize
classify
observe
inquire
communicate
infer
predict

e e o e i p i m g e n e r a l i i n
s s s r i c o m m u n i c a t e q f
e e i r e m i n q u i u r r b v a n
s n c l a s s i f y c n e c n e f i
e u e i a e b e z c i l e t q u i p
f m c o m m u n i c m e e m n s e e
l a d e s c r i a s i i a o d n d i
i c e g e n e r a l i z e o s n e c
c e u d e s c r i b e d c e n i c n
r i m r e l i d t g s s i r r e n d
r i e t d r n e i i d i n f e r s q
b e z a e i n q u i r e o i u m a c
c m a c p r e d i c t l i c n l l t
i r e e c q r i e i i n f p i v e e
i t u f i s m i b o b s e r v e o q
e e e t g i p r e d i e i s i i i s
e a i f b r m o b s e r v e i y e e
n c a v c l a s s i f i c o g n c e
l l s e m m r y m r e e i t e d e s
r v i e e r d e c e f a e n e r s e

Sight Words Activity Page

Have the students cut out the key words and glue them at the bottom of their pictures.





communicate	observe	describe	classify
predict	generalize	inquire	infer

Sight Words Activity Page

Have the students print the key words from this unit horizonally in the boxes (each word may be written more than once). They should then fill in all other boxes with any letters. Have the students exchange pages. The students should then circle the words on the page.

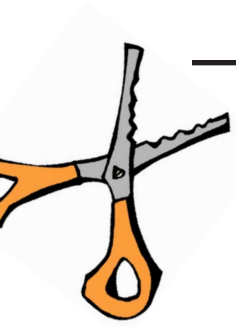
STUDENT SUPPORT MATERIALS

Basic Reading • Encoding

Encoding Activity Page

Have the students cut out and encode the syllables of the words, OR number the syllables in their correct sequence.

er	ize	gen	al
si	clas	fy	
mu	cate	com	ni



STUDENT SUPPORT MATERIALS

Reading Comprehension

Reading Comprehension Activity Page

Have the students read the text and then select the correct answer for it. They should fill in the appropriate bullet beside the answer of their choice.

1. What is it called when we try to think what will happen at the end of a movie?
   - ❍ classifying
   - ❍ predicting
   - ❍ multiplying
   - ❍ inquiring

2. When we inquire, what are we doing?
   - ❍ We are cooking.
   - ❍ We are looking for information.
   - ❍ We are grouping things by color.
   - ❍ We are watching a movie.

3. When we observe something, what are we doing?
   - ❍ We are sleeping.
   - ❍ We are cooking with brown sugar.
   - ❍ We are watching something.
   - ❍ We are eating a food from another country.

4. Which of these would go with communicate?
   - ❍ a rock
   - ❍ a black belt
   - ❍ sleeping during the day
   - ❍ a cell phone

5. When we infer, we are
   - ❍ using information to catch big fish.
   - ❍ using information to send an e-mail.
   - ❍ using information to cook a meal.
   - ❍ using information to decide something.

Reading Comprehension Activity Page

6 When we describe something, we

- ❍ tell something about it.
- ❍ tell someone to have a big supper.
- ❍ tell a person to go home.
- ❍ tell someone to go to bed.

7 When we decide that too much sugar is bad for us, we are

- ❍ reading.
- ❍ classifying.
- ❍ inquiring.
- ❍ generalizing.

8 When we put the knives, forks, and spoons in their own trays, we are

- ❍ inferring.
- ❍ classifying.
- ❍ communicating.
- ❍ predicting.

Reading Comprehension Activity Page

Have the students write the letters for sentence halves that match.

1	We can try to predict	A	how something looks.
2	We can observe	B	we are generalizing.
3	We can describe	C	we are guessing information.
4	When we sort things by how they taste,	D	we inquire about how much it costs.
5	When we make a decision from what we know,	E	in many different ways.
6	When we infer something,	F	the weather.
7	People can communicate	G	we are classifying.
8	When we buy a new house,	H	plants and animals around us.

1→_____ 2→ _____ 3→ _____ 4→ _____

5→ _____ 6→ _____ 7→ _____ 8→ _____

Reading Comprehension Activity Page

Have the students cut out the words and glue them under their definitions.

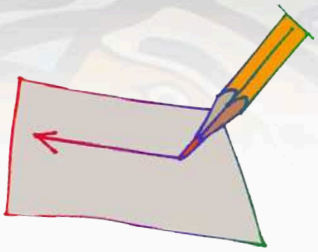
to come to a conclusion	**to think what will happen next**	**to tell how something looks, feels, tastes, and so on**
to contact other people	**to group things**	**to imagine some information**
to watch something	**to ask about something**	

communicate	**observe**	**describe**	**classify**
predict	**generalize**	**inquire**	**infer**

STUDENT SUPPORT MATERIALS

Basic Writing

Basic Writing Activity Page



Have the students write in the missing letters.

pre_____

ob_____e

des_____e

cl_____y

gen_____e

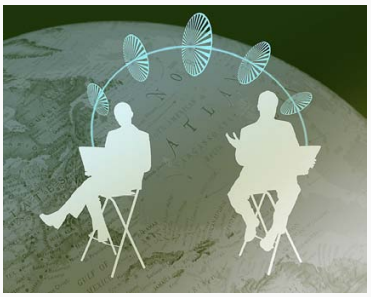
in_____

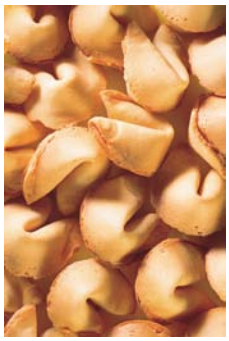
com_____te

inq_____

Basic Writing Activity Page

Have the students write the word for each picture.

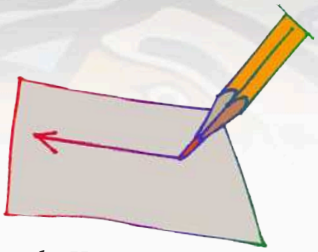




STUDENT SUPPORT MATERIALS

Creative Writing

Creative Writing Activity Page



Have the students write sentences of their own, using the key words from this unit. When the students' sentences are finished, have them take turns reading their sentences orally. The students should say "Blank" for the key words; the other students must name the "missing" words. You may wish to have the students write the "definitions" for the key words.

PREDICT

_____

OBSERVE

_____

DESCRIBE

_____

CLASSIFY

_____

GENERALIZE

_____

INFER

_____

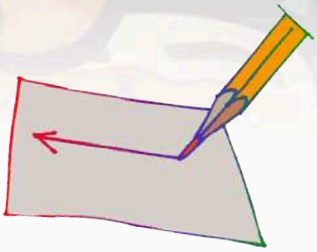
COMMUNICATE

_____

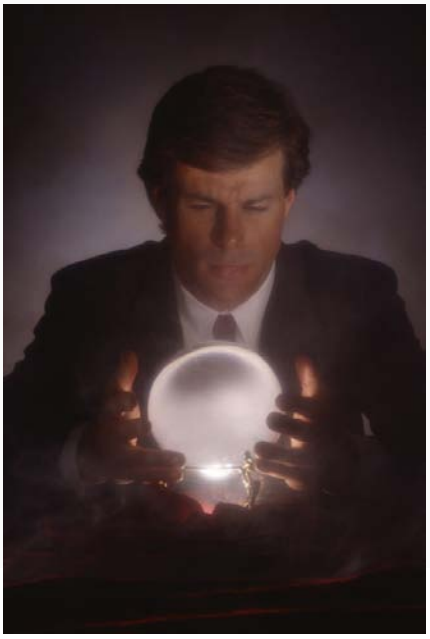
INQUIRE

_____

Creative Writing Activity Page



Have the students write sentences of their own, based on the picture below. When finished, have each student read his/her sentences to the others.



UNIT ASSESSMENT

A–1: Science as Inquiry Process

SCIENCE PROGRAM

Unit Assessment Teacher's Notes
Grade 6 • Unit 1 (A–1)
Theme: Science as Inquiry Process

Date:_____

Unit Assessment

Provide each student with a copy of the students' pages. Read the following instructions aloud. The students should answer the questions on their copies of the assessment.

BASIC LISTENING

Turn to pages 1–2 in your test. Look at the pictures in the boxes.

1. Write the number 1 on top of the picture for **PREDICT**.
2. Write the number 2 on top of the picture for **OBSERVE**.
3. Write the number 3 on top of the picture for **DESCRIBE**.
4. Write the number 4 on top of the picture for **CLASSIFY**.
5. Write the number 5 on top of the picture for **GENERALIZE**.
6. Write the number 6 on top of the picture for **INFER**.
7. Write the number 7 on top of the picture for **COMMUNICATE**.
8. Write the number 8 on top of the picture for **INQUIRE**.

LISTENING COMPREHENSION

Turn to page 3 in your test. Listen to the sentences I say. Circle "T" for true and "F" for false sentences."

1. When we predict, we are inferring.
2. We observe during the night when we are asleep.
3. We can describe things by how they feel.
4. We usually classify the clothes before we wash them.
5. We generalize when we have no information.
6. We can infer things from information we get.
7. We can use language to communicate with other people.
8. A person might inquire about something to get information.

Unit Assessment

Provide each student with a copy of the students' pages. Read the following instructions aloud. The students should answer the questions on their copies of the assessment.

SIGHT RECOGNITION

Turn to page 4 in your test. Look at the pictures in the boxes. Circle the word for each picture.

DECODING/ENCODING

Turn to page 5 in your test. Look at the word parts in the boxes. Circle the other half or part of each word.

READING COMPREHENSION

Turn to page 6 in your test. Read the sentence part and fill in the bullet for the correct sentence ending.

BASIC WRITING

Turn to page 7 in your test. Look at the pictures in the boxes. Write the word for each picture.

CREATIVE WRITING

Turn to page 8 in your test. Write a sentence of your own, using each word.

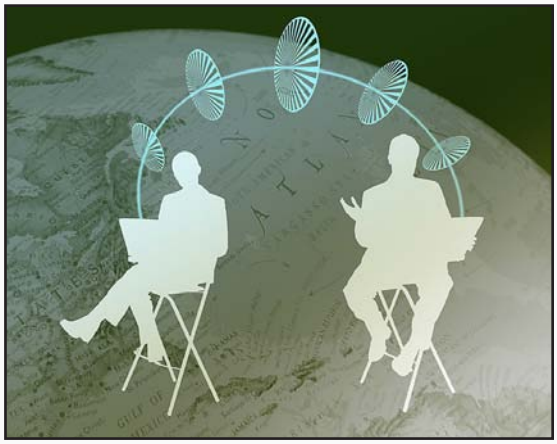
Teacher: To get a percentage for this student's assessment, divide the total number of questions correct by the total number of questions, then multiply this answer by 100 to determine the percentage of questions answered correctly.

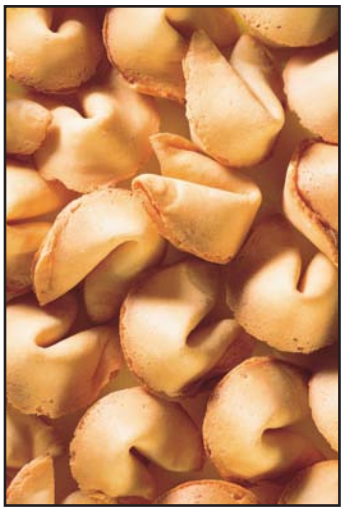
SCIENCE PROGRAM

Unit Assessment Student Pages
Grade 6 • Unit 1 (A–1)
Theme: Science as Inquiry Process

Date:_____ Student's Name:_____

Number Correct:_____ Percent Correct:_____





1. T F

2. T F

3. T F

4. T F

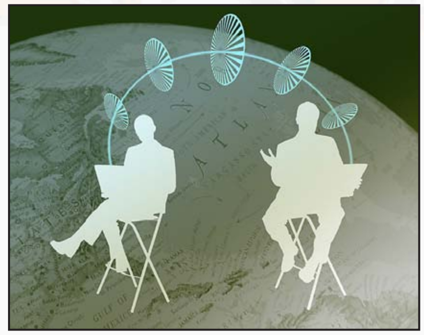
5. T F

6. T F

7. T F

8. T F

predict
observe
describe
classify
generalize
infer
communicate
inquire



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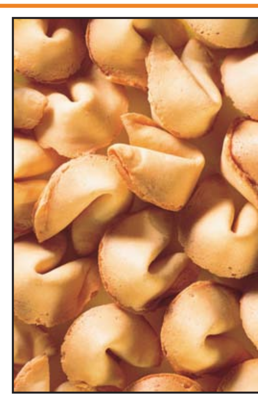


predict
observe
describe
classify
generalize
infer
communicate
inquire

pre	duct dict duction dact dect dun dootion diict debt
ob	surve sirve seerve surve serve sserve sirev serev sevy
des	crube crybe crabe cripe cribe kribe krube crip crebe
clas	ssifyt ify afy sufy savy safy suuvy sify ity
gener	ilize ulize ralize rulize lize luze aize al alize
in	fir for fur fer er ur fuur far ffer
communi	kite kate cute cate ate kete cete dat cat
in	quore quire quure qire qure quaere quqy quiire quiere

1. We can predict
   - ❍ the end of a story.
   - ❍ how old we are.
   - ❍ our names

2. We observe when
   - ❍ we close our eyes.
   - ❍ we watch something.
   - ❍ we go to sleep.

3. We can describe a thing
   - ❍ only by its weight.
   - ❍ only by what we see.
   - ❍ in many different ways.

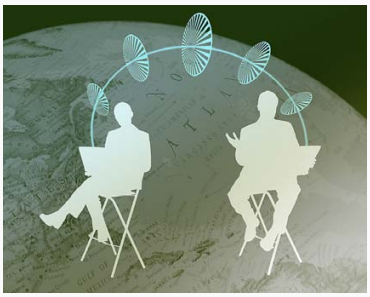
4. We classify things when we
   - ❍ throw them out.
   - ❍ buy them.
   - ❍ group them.

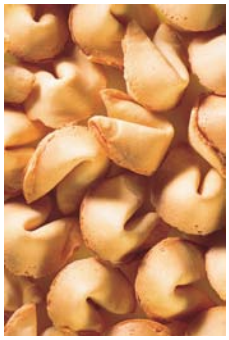
5. We can generalize
   - ❍ only what we see.
   - ❍ many different things.
   - ❍ when we sleep.

6. When we infer, we are
   - ❍ imagining.
   - ❍ eating.
   - ❍ running.

7. Which of these is used to communicate?
   - ❍ a chair.
   - ❍ a computer.
   - ❍ knives, forks, and spoons.

8. When we inquire about something, we are
   - ❍ asking about it.
   - ❍ eating it.
   - ❍ giving it away.





PREDICT

_____

OBSERVE

_____

DESCRIBE

_____

CLASSIFY

_____

GENERALIZE

_____

INFER

_____

COMMUNICATE

_____

INQUIRE

_____